REMARKS

Claims 17-21 are pending.

Claims 17-21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Amend (US 2,070,770). Applicants respectfully traverse this rejection.

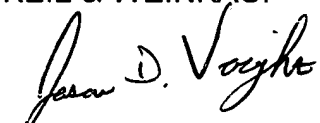
Amend discloses the hydrogenation of C_1, C_2, mixed C_5 to C_8, and mixed C_8 to C_{18} phthalates and therefore also the hydrogenated products of the esters. However, Amend does not disclose mixtures of isomers of dicarboxylic esters as presently claimed. The examiner argues that it would have been obvious that any alkyl phthalate may be employed and that mixed dialkyl phthalates may be formed. However, it appears that Amend discloses hexahydrophthalates having straight-chain alkyl residues, as would result, for example, from the use of dialkyl phthalates prepared from straight-chain primary alcohols (Amend column 3, line 17). The present claims are directed to mixtures of isomers of dicarboxylic acid diesters, at least some of which would have branched alkyl residues. The use of cyclohexanedicarboxylates having branched alkyl residues has unexpected, advantageous properties over cyclohexane-dicarboxylates having linear alkyl residues. Such unexpectedly advantageous properties over the compounds of Amend evidence non-obviousness of the present invention.

In particular, applicants direct the Examiner's attention to the Comparative Examples (copy enclosed) submitted with the European counterpart of this PCT application. In those examples, cyclohexanedicarboxylates with linear alkyl residues were tested with respect to their properties as plasticizers for PVC and compared to plasticizers according to the present invention. As can be seen therein, the solution

temperature at the clear point of the cyclohexanedicarboxylates with branched alkyl residues according to the invention is significantly lower than that of the corresponding cyclohexanedicarboxylates with a linear alkyl residue, leading to better gelation performance of the plasticizers according to the invention. Additionally, the tensile strength of the soft-PVC compounds prepared using the cyclohexanedicarboxylates with branched alkyl residues according to the invention is higher than that prepared from the corresponding cyclohexanedicarboxylates with a linear alkyl residue. If the Examiner requests, applicants can put this data in the form of a declaration under 37 CFR 1.132.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11.0345. Please credit any excess fees to such deposit account.

Respectfully submitted,
KEIL & WEINKAUF



Jason D. Voight
Reg. No. 42,205

1350 Connecticut Avenue, N.W.
Washington, D.C. 20036
(202) 659-0100

Translation of the comparative examples submitted for the European Patent Application No. 98 966 901.5 on February 28,2002:

Patent application PCT/EP98/08346

Comparative Examples

According to the suggestion of the Examination Division in the International Preliminary Examination Report issued on April 10, 2002, form PCT/Beiblatt/409 (Page 3) comparative examples were prepared. Starting from commercially available n-nonanol (Acros Organics, order no. 15747-2500) or commercially available n-decanol (Acros Organics, order no. 16576-0025), respectively, di-n-nonylphthalat or di-n-decylphthalat were prepared by esterification with phthalic acid anhydride. These phthalates with linear alkyl residues were then hydrogenated according to the process claimed in PCT/EP98/08346 to the respective di-n-nonylcyclohexanedicarboxylate or di-n-decylcyclohexanediarboxylate. Subsequently, these cyclohexanedicarboxylates with linear alkyl residues were tested in view of their properties as plasticizers for PVC in different applications and compared to the corresponding plasticizers according to the invention of PCT/EP98/08346, i. e. with diisononylcyclohexanedicarboxylate of Example 2 or Example 14, respectively, and diisodecylcyclohexanedicarboxylate prepared according to Example 2, in their properties as plasticizers.

Description of the tests:

Plasticizers:

1) di-n-nonylcyclohexanedicarboxylate (prepared as described above)
2) di-n-decylcyclohexanedicarboxylate (prepared as described above)
3) diisononylcyclohexanedicarboxylate according to Example 2 or 14 of PCT/EP98/08346
4) diisodecylcyclohexanedicarboxylate analogous Example 2 of PCT/EP98/08346

Tests of the Plasticizer:

For the pure plasticizer, the solution temperature at the clear point for PVC was measured (according DIN 53408). The solution temperature at the clear point is a measure for the gelation performance of a plasticizer. The higher the solution temperature at the clear point, the lower is the gelation performance.

Preparation of soft-PVC-compounds (test sample):

In each case, 100 parts suspension PVC (K-value 71, type "Vinoflex S 7114" or "Solvin 271 SP"), 67 parts of plasticizer and 2 parts Ba/Zn-stabilizer (type "Lankromark LZB 753") were mixed with a hand-mixer at room temperature. The mixture was then plastified on a steam-heated laboratory rolling mill (company Collin, type "150") and processed to a sheeted-out compound. The temperature of both cylinders was 170 to 180 °C, the turn number was about 15 turns per minute (front roll) and 12 turns per minute (back roll); the milling time was 5 minutes. A sheeted-out compound was obtained with a thickness of 0.55 mm. The cooled sheeted-out compound was afterwards molded on a press of the type "400 P" of company Collin at a temperature of 180 to 190 °C and a pressure of 220 bar within 400 seconds to a soft-PVC-film with a thickness of 0.50 mm.

Testing of the soft-PVC-compounds:

For the soft-PVC-films, the mechanical properties (tensile strength according to DIN 53455 or DIN EN ISO 527, part 1 and 3), the thermostability (thermostability according to DIN 53381, part 2, process E, and HCl thermal stability according to VDE-norm 0472, §614), and the compatibility (according to BASF-method according to Annex) were tested.

Annex

Testing of Compatibility of Plasticizers according to BASF-Method

The compatibility of a plasticizer in a soft-PVC-compound is determined by measuring the loss in weight of a soft-PVC-compound due to exudation of the plasticizer after a defined time by weighing the compound after the soft-PVC-compound was stored at a temperature of 70 °C and 100 % relative humidity over a longer period. The determination of the compatibility is carried out according to the following description:

Purpose of the Testing

The testing is done for the quantitative measurement of the compatibility of plasticizers in soft-PVC-mixtures. It is carried out at elevated temperature (70 °C) and humidity (100 % relative humidity). The data obtained are analyzed in comparison to the storage time.

Testing Sample

For the testing, testing samples (films) with a size of 75 x 110 x 0.5 mm are used. A hole is punched in the longer side of the films, the film is marked (soldering bit) and weighed.

Testing Apparatus

Heraeus-heating oven at 70 °C, analysis scale, temperature measuring apparatus Testotherm with sensor for measuring within the heating oven.

Description

The temperature within the heating oven is set to 70 °C. The previously prepared weighed films are hung up on a wire which is fixed in a glass bowl which is filled to about 5 cm with water (VE-water). The films should not touch each other. The lower edges of the films must not hang in the water. The glass bowl is sealed with a PE-film to avoid leaking of the steam which is prepared within the glass bowl. The water level in this glass bowl is checked daily and after water loss additionally water is added.

Storage Time

Each day, two films are taken from the glass bowl and climatized for one hour in air. Afterwards, the films are cleaned at the surface with methanol. Then, the films are dried for 16 hours at 70 °C in a drying oven with forced convection hanging free. After removal from the drying oven, the films are climatized for one hour hanging free and then weighed. In each case the average value is given for the loss of weight of the films.

All results of the tests are listed in the following two tables. In each case the cyclohexanedicarboxylate according to the invention with a branched alkyl residue is compared to the corresponding cyclohexanedicarboxylate with a linear alkyl residue.

Parameter	**Testing Method**	**Plasticizer**	
		Diisononylcyclohexanedicarboxylate according to Example 2 or 14 of PCT/EP/98/08346	**Di-n-nonylcyclohexanedicarboxylate**
Solution temperature at the clear point for PVC (°C)	DIN 53408	150	154
Tensile Strength (N/mm^2)	DIN 53447	17,6	16,4
Thermostability at 180 °C (min)	DIN 53381, Part 2, Process E	127	116
HCl thermal stability at 200 °C (min)	VDE-Norm 0472, §614	21,0	19,8
Compatibility (Weight Loss after 7 days (%))	BASF-Method (according to Annex)	0,47	0,57

Parameter	**Testing Method**	**Plasticizer**	
		Diisodecylcyclohexanedicarboxylate analogous to Example 2 of PCT/EP/98/08346	**Di-n-decylcyclohexanedicarboxylate**
Solution temperature at the clear point for PVC (°C)	DIN 53408	160	164
Tensile Strength (N/mm^2)	DIN 53447	19,1	16,4
Thermostability at 180 °C (min)	DIN 53381, Part 2, Process E	127	118
HCl thermal stability at 200 °C (min)	VDE-Norm 0472, §614	21,7	19,8
Compatibility (Weight Loss after 7 days (%))	BASF-Method (according to Annex)	0,41	0,87

Both comparisons show that the solution temperature at the clear point of the cyclohexanedicarboxylates with branched alkyl residues according to the invention is significantly lower than the solution temperature at the clear point of the corresponding cyclohexanedicarboxylates with a linear alkyl residue. Therefore, the gelation performance of the plasticizers according to the invention is better.

Above this, the tensile strength of the soft-PVC-compounds prepared using the cyclohexanedicarboxylates with branched alkyl residues according to the invention is higher than that of those prepared from the corresponding cyclohexanedicarboxylates with a linear alkyl residue. The plasticizers according to the invention therefore lead to better mechanical properties.

Furthermore, the thermostability and the HCl thermal stability of the soft-PVC-compound prepared using the cyclohexanedicarboxylates with branched alkyl residues according to the invention are significantly higher than those of the ones prepared from the corresponding cyclohexanedicarboxylates with a linear alkyl residue. The plasticizer according to the invention therefore leads to better thermostability.

Additionally, the cyclohexanedicarboxylates with branched alkyl residues according to the invention show better compatibility with PVC (lower loss in weight) than the corresponding cyclohexanedicarboxylates with linear alkyl residues.

Thus, the comparative examples show that the cyclohexanedicarboxylates according to the invention surprisingly show advantageous properties as plasticizers which can be put down to the branched alkyl residues.